

Roya Bahreini

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Education

California Institute of Technology, Pasadena, CA

Ph.D., Environmental Science and Engineering, February 2005
Thesis: "Studies with the Aerosol Mass Spectrometer"
Advisor: Prof. John H. Seinfeld

California Institute of Technology, Pasadena, CA

M.S., Environmental Science and Engineering, June 2003

University of Maryland, College Park, MD

B.S., Chemical Engineering, Summa cum Laude, May 1999

Awards and Honors

University of Colorado- CIRES Visiting Scholar Fellowship, June 2005-2007
NRC Postdoctoral Fellowship (Declined, 2005-2006)
Selected to attend the Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS) and Gordon Research Conference in Atmospheric Chemistry, Sep. 2005
NASA Group Achievement Award for CRYSTAL-FACE field project, 2003
James Clark School of Engineering Award, U. of Maryland, 1998-1999
Robert Beckman Scholarship, U. of Maryland, 1998-1999
American Institute of Chemist Foundation Award, U. of Maryland, 1999
Women in Engineering Research Fellowship, U. of Maryland, 1998-1999
Senior Summer Scholars Scholarship, U. of Maryland, 1998
Julius White Award in Chemistry, Montgomery College, 1997
Bechtel Women in Engineering Scholarship, Montgomery College, 1996-1997
Pleides Women in Science Scholarship, Montgomery College, 1996-1997
Thomas E. Kenny Award in Chemistry, Montgomery College, 1995

Research Experience

University of Colorado, CIRES and NOAA-ESRL-CSD, June 2005-present

- Analyzed gas phase and Quadrupole Aerosol Mass spectrometer (Q-AMS) data collected during NOAA-winter 2005 field project in Boulder, CO
- Performed laboratory characterization of a pressure controlled inlet to be used in airborne measurements with AMS as part of its inlet system
- Performed laboratory intercomparison experiments between an AMS, a Cavity Ring-Down Spectrometer (CaRDS) or a Particle- Into-Liquid Sampler (PILS), and an Ultra-High Sensitivity Aerosol Spectrometer (UHSAS)
- Performed laboratory characterization of several aerodynamic lens systems to be used in

- the compact time-of-flight (C-ToF) AMS
- Participated in and analyzed data from airborne measurements with C-ToF AMS aboard NOAA WP-3D aircraft during TexAQS-II (2006) and ARCPAC (2008) as well as ground-based measurements with C-ToF AMS during NORAA-Boulder (July 2008) studies.

California Institute of Technology, Pasadena, CA, Sep. 1999-May 2005

- Participated in airborne field measurements using a quadrupole aerosol mass spectrometer (Q-AMS) aboard the CIRPAS Twin Otter aircraft and analyzed the data during ICARTT (2004), CSTRIPPE (2003), CRYSTAL-FACE (2002), and ACE-Asia (2001)
- Carried out laboratory chamber experiments to study physical and chemical properties of Secondary Organic Aerosols (SOA) using the AMS
- Carried out experiments to study formation of new particles from photooxidation of CH_2I_2 in a laboratory chamber and developed a model to characterize chemical kinetics of the experiment
- Assembled a calibration system of a differential mobility analyzer (DMA) and a condensation particle counter (CPC) with active flow control to create a monodisperse stream of aerosols out of a polydisperse distribution of particles
- Maintained various instruments including DMAs, CPCs, and a gas-chromatograph

University of Maryland, College Park, MD, Sep. 1998- July 1999

- Characterized aerosol particles generated from sugar and protein solutions using an orifice-disk impactor

Publications

Bahreini, R., B. Ervens, A.M. Middlebrook, C. Warneke, J.A. de. Gouw, P.F. DeCarlo, J.L. Jimenez, C.A. Brock, J.A. Neuman, T.B. Ryerson, H. Stark , E. Atlas, J. Brioude, A. Fried, J.S. Holloway, J. Peischl, D. Richter, J. Walega, P. Weibring, A.G. Wollny, F.C. Fehsenfeld , Organic Aerosol Formation in Urban and Industrial Plumes near Houston and Dallas, TX. *J. Geophys. Res.- Atmospheres*, doi:10.1029/2008011493, In press, 2009.

Brown, S.S., W. P. Dubé, H. Fuchs, T.B. Ryerson, A.G. Wollny, C.A. Brock, **R. Bahreini**, A.M. Middlebrook, J.A. Neuman, E. Atlas, J.M. Roberts, H.D. Osthoff, M. Trainer, F.C. Fehsenfeld, and A.R. Ravishankara, Reactive uptake coefficients for N_2O_5 determined from aircraft measurements during TexAQS 2006; Comparison to current model parameterizations, *J. Geophys. Res.- Atmospheres*, doi:10.1029/2008JD011679, In press, 2009.

Neuman, J.A., J.B. Nowak, W. Zheng, F. Flocke, T. B. Ryerson, M. Trainer, J.S. Holloway, D. D. Parrish, G. J. Frost, J. Peischl, E. L. Atlas, **R. Bahreini**, A. G. Wollny, and F. C. Fehsenfeld, Relationship between photochemical ozone production and NOx oxidation in Houston, Texas, *J. Geophys. Res.- Atmospheres*, 114, D00F08, doi:10.1029/2008JD011688, 2009.

Warneke, C., **R. Bahreini**, J. Brioude, C. A. Brock, J. A. d. Gouw, D. W. Fahey, K. D. Froyd, J. S. Holloway, A. Middlebrook, L. Miller, S. Montzka, D. M. Murphy, J. Peischl, T. B. Ryerson, J. P. Schwarz, J. R. Spackman, and P. Veres, Biomass burning in Siberia and Kazakhstan as the main source for Arctic Haze over the Alaskan Arctic in April 2008. *Geophys. Res. Lett.*, 36, doi:10.1029/2008GL036194, 2009.

Bahreini, R., E.J. Dunlea, B.M. Matthew, C. Simons, K.S. Docherty, P.F. DeCarlo, J.L. Jimenez, C.A. Brock, A.M. Middlebrook, Design and Operation of a Pressure-controlled inlet for airborne sampling with an aerodynamic aerosol lens. *Aerosol Sci. Technol.*, 42 (6), doi: 10.1080/02786820802178514, 2008.

Zhang, Q., J.L. Jimenez, M.R. Canagaratna, J.D. Allan, H. Coe, I. Ulbrich, M.R. Alfarra, A. Takami, A.M. Middlebrook, Y.L. Sun, K. Dzepina, E. Dunlea, K. Docherty, P.F. DeCarlo, D. Salcedo, T. Onasch, J.T. Jayne, T. Miyoshi, A. Shimojo, S. Hatakeyama, N. Takegawa, Y. Kondo, J. Schneider, F. Drewnick, S. Borrmann, S. Weimer, K. Demerjian, P. Williams, K. Bower, **R. Bahreini**, L. Cottrell, R.J. Griffin, J. Rautiainen, J.Y. Sun, Y.M. Zhang, D.R. Worsnop, Ubiquity and dominance of oxygenated species in organic aerosols in anthropogenically-influenced northern hemisphere mid-latitudes, *Geophys. Res. Lett.*, 34 (13): L13801, doi: 10.1029/2007GL029979, 2007.

Fountoukis, C., A. Nenes, N. Meskhidze, **R. Bahreini**, W.C. Conant, H. Jonsson, S.M. Murphy, A. Sorooshian, V. Varutbangkul, F. Brechtel, R.C. Flagan, J.H. Seinfeld, Aerosol-cloud drop concentration closure for clouds sampled during the International Consortium for Atmospheric Research on Transport and Transformation 2004 campaign, *J. Geophys. Res.- Atmospheres*, 112, doi:10.1029/2006JD007272, 2007.

Marcolli, C., M.R. Canagaratna, D.R. Worsnop, **R. Bahreini**, J.A. de Gouw, C. Warneke, P.D. Goldan, W.C. Kuster, E.J. Williams, B.M. Lerner, J.M. Roberts, J.F. Meagher, F.C. Fehsenfeld, M. Marchewka, S.B. Bertman, A.M. Middlebrook, Cluster analysis of the organic peaks in bulk mass spectra obtained during the 2002 New England air quality study with and Aerodyne Aerosol Mass Spectrometer, *Atmospheric Chemistry and Physics*, 6: 5649-5666, 2006.

Sorooshian, A., V. Varutbangkul, F.J. Brechtel, B. Ervans, G. Feingold, **R. Bahreini**, S.M. Murphy, J.S. Holloway, E.L. Atlas, G. Buzorius, H. Jonsson, R.C. Flagan, J.H. Seinfeld, Oxalic acid in clear and cloudy atmospheres: Analysis of data from International Consortium for Atmospheric Research on Transport and Transformation 2004, *J. Geophys. Res.- Atmospheres*, 111, doi:10.1029/2005JD006880, 2006.

Varutbangkul, V., F.J. Brechtel, **R. Bahreini**, N.G. Ng, M.D. Keywood, J.H. Kroll, R.C. Flagan, J.H. Seinfeld, A. Lee, A.H. Goldstein, Hygroscopicity of secondary organic aerosols formed by oxidation of cycloalkenes, monoterpenes, sesquiterpenes, and related compounds, *Atmospheric Chemistry and Physics*, 6: 2367-2388, 2006.

Lee, A., A.H. Goldstein, M.D. Keywood, S. Gao, V. Varutbangkul, **R. Bahreini**, N.L. Ng, R.C. Flagan, J.H. Seinfeld, Gas-phase products and secondary aerosol yields from the ozonolysis of then different terpenes, *J. Geophys. Res.- Atmospheres*, 111, doi:10.1029/2005JD006437, 2006.

Ng, N.L, J.H. Kroll, M.D. Keywood, **R. Bahreini**, V. Varutbangkul, R.C. Flagan, J.H. Seinfeld, Contribution of first- vs. second- generation products to secondary organic aerosols formed in the oxidation of biogenic hydrocarbons, *Environ. Sci. Technol.*, 40 (7), doi:10.1021/es052269u, 2006.

Bahreini, R., M.D. Keywood, N.L. Ng, V. Varutbangkul, S. Gao, R.C. Flagan, J.H. Seinfeld, D.R. Worsnop, Measurements of Secondary Organic Aerosol (SOA) from oxidation of cycloalkenes, terpenes, and *m*-xylene using the Aerodyne Aerosol Mass Spectrometer, *Environ. Sci. Technol.*, 39 (15), 10.1021/es048061a, 2005.

Keywood, M.D., V. Varutbangkul, **R. Bahreini**, R.C. Flagan, J.H. Seinfeld, Secondary organic aerosol formation from the ozonolysis of cycloalkenes and related compounds, *Environ. Sci. Technol.*, 38 (15): 4157-4164, 2004.

Keywood, M.D., J.H. Kroll, V. Varutbangkul, **R. Bahreini**, R.C. Flagan, J.H. Seinfeld, Secondary organic aerosol formation from cyclohexene ozonolysis: Effect of OH scavenger and the role of radical chemistry, *Environ. Sci. Technol.*, 38 (12): 3343-3350, 2004.

Gao, S., M.D. Keywood, N.L. Ng, J. Surratt, V. Varutbangkul, **R. Bahreini**, R.C. Flagan, J.H. Seinfeld, Low-molecular-weight and oligomeric components in secondary organic aerosol from the ozonolysis of cycloalkenes and α -pinene. *J. Phys Chem.*, doi: 10.1021/jp047466e, 2004.

Gao, S., N.L. Ng, M.D. Keywood, V. Varutbangkul, **R. Bahreini**, A. Nenes, J. He, K.Y. Yoo, J.L. Beauchamp, R.P. Hodges, R.C. Flagan, J.H. Seinfeld, Particle phase acidity and oligomer formation in secondary organic aerosol. *Environ. Sci. Technol.*, doi: 10.1021/es049125k, 2004.

Conant, W.C., T.M. Vanreken, T.A. Rissman, V. Varutbangkul, H.H. Jonsson, A. Nenes, J.L. Jimenez, A.E. Delia, **R. Bahreini**, G.C. Roberts, R.C. Flagan, J.H. Seinfeld, Aerosol-cloud drop concentration closure in warm cumulus, *J. Geophys. Res.- Atmospheres*, 109, D13204, doi:10.1029/2003JD004324, 2004.

Bahreini, R., J.L. Jimenez, J. Wang, J.T. Jayne, D.R. Worsnop, R.C. Flagan, J.H. Seinfeld, Aircraft-based aerosol size and composition measurements during ACE-Asia using an Aerodyne Aerosol Mass Spectrometer, *J. Geophys. Res.- Atmospheres*, 108, D23, 8645, doi:10.1029/2002JD003226, 2003.

Jimenez, J.L., **R. Bahreini**, D.R. Cocker, H. Zhuang, V. Varutbangkul, R.C. Flagan, J.H. Seinfeld, T. Hoffmann, C. O'Dowd, New Particle formation from photooxidation of diiodomethane (CH_2I_2). *J. Geophys. Res.- Atmospheres*, 108, D10, 4318, doi:10.1029/2002JD002452, 2003.

O'Dowd, C., J.L. Jimenez, **R. Bahreini**, R.C. Flagan, J.H. Seinfeld, K. Hameri, L. Pirjola, M. Kulmala, S.G. Jennings, T. Hoffmann, Marine aerosol formation from biogenic iodine emissions. *Nature*, 417: 632-636, 2002.

Presentations at Conferences

Observations of Organic Aerosol Mass (OM) Growth Downwind of Urban and Industrial Sources in Houston Area- Oral Presentation at AGU Fall Meeting, San Francisco, CA, 2008.

Formation and Processing of Organic Aerosols Measured by a Time of Flight Aerosol Mass Spectrometer during TexAQS/GoMACCS 2006- Poster Presentation at AGU Fall Meeting, San Francisco, CA, 2007.

Wintertime Measurements of Fine Aerosol Chemical Composition and Gas Phase Precursors Near the Flatirons in Boulder, Colorado- Oral Presentation at AAAR Meeting, Reno, NV, Sep. 2007.

Measurements of Chemical Composition of submicron Aerosols onboard NOAA WP-3D during TexAQS-2006- Poster Presentation at TexAQS Data Workshop, Austin, TX, May 2007.

Measurements of Aerosol Size and Chemical Composition by a Compact Time of Flight Aerosol Mass Spectrometer (C-ToF-AMS) Aboard NOAA WP-3D Aircraft during TexAQS-2006- Poster Presentation at AGU Fall Meeting, San Francisco, CA, 2006.

Comparisons of Aerosol Phase Sulfate, Nitrate, and Ammonium Concentrations Measured by an Aerodyne Aerosol Mass Spectrometer and a Particle Into Liquid Sampler- Poster presentation at AGU Fall Meeting, San Francisco, CA, 2005.

Measurements of Secondary Organic Aerosol (SOA) from oxidation of cycloalkenes, terpenes, and m-xylene using an Aerodyne Aerosol Mass Spectrometer- Invited oral presentation at ACCESS, Yellowstone, WI, 2005.

Measurements of physical and chemical properties of Secondary Organic Aerosols (SOA) from chamber studies using the Aerodyne Aerosol Mass Spectrometer (AMS)- Poster presentations at AAAR, Atlanta, GA, 2004 and GRC Atmospheric Chemistry, Big Sky, MT, 2005.

Aerosol size distribution, composition, and hygroscopicity measurements during CSTRIPE mission in Monterey, California using an Aerosol Mass Spectrometer and a dual Differential Mobility Analyzer- Poster presentation at AGU, San Francisco, CA, 2003.

Aircraft-based aerosol size and composition measurements during ACE-Asia and CRYSTAL-FACE using an Aerodyne Aerosol Mass Spectrometer- Oral presentation at AAAR, Charlotte, NC, 2002.

Teaching Experience

California Institute of Technology, Pasadena, CA

Chemical Engineering Department

Aerosol Physics and Chemistry, Teaching Assistant, Winter 2001

Professional Memberships and Services

Member of the American Association for Aerosol Research (AAAR) and the American Geophysical Union (AGU)

Reviewer for the Journal of Geophysical Research- Atmospheres, Environmental Science and Technology, Aerosol Science and Technology, and Atmospheric Environment